

DETAILED ACTION

Claim Status

1. Claims 3-5, 7-12, 14-22, and 31 are pending.

Specification

2. Applicant's amendment to the title is acknowledged.

Claim Rejections - 35 USC § 101

3. Prior rejections under 101 directed towards claims 3-18 and 31 are withdrawn.
4. Regarding claims 19 and 20, these claims recite a 'computer-readable medium'. In the absence of any modifying disclosure of this limitation in the specification, the examiner interprets the terms 'computer-readable medium' as excluding printed paper, transmission media, signals, or any form of energy, such that the claims clearly falls within a statutory class of invention as required under the terms of 35 U.S.C. 101.

Examiner's Amendment

5. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

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6. Authorization for an examiner's amendment was given in a telephone interview with Mr. Jonathan N. Geld (reg. 44,702) on August 27, 2009.

7. **In the claims:**

Claims 3, 4, 5, 7, 9, 11, 12, 14, 19-21, and 31 have been amended. Claims 6, 13, and 23-30 have been cancelled. Please replace all prior claims with the claims below.

3. (Currently Amended) A method for processing a relational database query, comprising:

generating, using a processor coupled to a multidimensional data source, a relational model of the multidimensional data source using one or more of a schema for the multidimensional data source and metadata for the multidimensional data source,

wherein the relational model comprises:

a relational-to-multidimensional mapping between a virtual relational table for a relational database application corresponding to the multidimensional data source and the multidimensional data source, and

the schema and metadata [[are]] accessed from the multidimensional data source for the virtual relational table;

forming the relational database query from the relational database application against the relational model of the multidimensional data source using a graphical user interface displayed on a display coupled to the processor, wherein the graphical user interface:

displays a presentation layer representation of the virtual relational table
for the relational database application corresponding to the multidimensional data
source, [[and]]

enables pointer-driven selection for [[database]] query of one or more
tables and columns of data stored in the multidimensional data source and
represented by the displayed presentation layer representation,[[;]]

and enables selection of a detail filter to apply against the relational
model;

receiving the relational database query, the received relational database query being
drawn against the relational model of the multidimensional data source, wherein

the relational database query specifies a detail filter against the relational model
having selected predicates;

using the relational-to-multidimensional mapping together with
relational/multidimensional equivalency logic to construct a multidimensional database query
based on the received relational database query, wherein the relational/multidimensional
equivalency logic comprises a general mapping between relational queries and structures and
multidimensional queries and structures, wherein

the constructed multidimensional query specifies, for each of the selected
predicates that can be applied against the relational model of the multidimensional data
source before a crossjoin operation is performed, applying the selected predicate against
the relational model of the multidimensional data source before the crossjoin operation is
performed;

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submitting the constructed multidimensional database query for execution against the modeled multidimensional data source, wherein the multidimensional data source comprises three or more dimensions; and

displaying, on the display, a result of the constructed multidimensional database query against the modeled multidimensional data source.

4. (currently amended) The method of claim 3 wherein the multidimensional query is constructed in MDX (Multidimensional Expressions).

5. (currently amended) The method of claim 4 wherein the relational query is expressed in SQL(Structured Query Language).

6. (cancelled)

7. (currently amended) The method of claim [[6]] 3 wherein the relational query is expressed in SQL (Structured Query Language), and wherein the detail filter specified by the relational query is an SQL WHERE clause.

8. (Original) The method of claim 3 wherein the relational query specifies an aggregation function against the relational model, and wherein the constructed multidimensional query specifies that the aggregation function be applied to the modeled multidimensional data source.

9. (currently amended) The method of claim 8 wherein the relational query is expressed in SQL (Structured Query Language), and wherein the aggregation function specified by the relational query is an SQL GROUP BY clause.

10. (Previously Presented) The method of claim 3, wherein

the graphical user interface enables selection of a summary filter to apply against the relational model,

the relational query specifies the summary filter against the relational model, and

the constructed multidimensional query specifies that the summary filter be applied to the modeled multidimensional data source.

11. (currently amended) The method of claim 10 wherein the relational query is expressed in SQL(Structured Query Language), and wherein the summary filter specified by the relational query is an SQL HAVING clause.

12. (currently amended) The method of claim 3, wherein

[[the graphical user interface enables selection of a detail filter to apply against the relational model, and

the relational query specifies the detail filter against the relational model having selected predicates, and

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the constructed multidimensional query specifies, for each of the selected predicates that can be applied against the modeled multidimensional data source before a crossjoin operation is performed, applying]] the selected predicates are applied against the modeled multidimensional data source as early as possible.

13. (cancelled)

14. (currently amended) The method of claim 3 wherein the relational query specifies performing a selected aggregation function on a selected column of [[a]]the virtual relational table, the virtual relational table corresponding to a multidimensional data source, the selected column corresponding to a selected measure of the multidimensional data source, the method further comprising:

retrieving metadata identifying an aggregation function used for the selected measure of the multidimensional data source;

determining whether the aggregation function identified by the metadata matches the selected aggregation function; and

if the aggregation function identified by the metadata matches the selected aggregation function, generating a multidimensional query against the multidimensional data source that relies on the aggregation function performed in the multidimensional data source.

15. (Original) The method of claim 3, further comprising:

receiving, in response to submitting the multidimensional database query, a multidimensional database query result; and

using a relational-to-multidimensional mapping contained by the model together with relational/multidimensional equivalency logic to construct a relational database query result based on the received multidimensional database query result.

16. (Original) The method of claim 3, further comprising:

determining that the received relational database query is drawn against both the relational model of the multidimensional data source and one or more native relational tables; and

constructing a native relational database query based on aspects of the received relational database query drawn against conventional relational tables; and

submitting the native relational database query for execution against the conventional relational tables,

and wherein the constructed multidimensional database query is based on aspects of the received relational database query drawn against the relational model of the multidimensional data source, the method further comprising:

receiving, in response to submitting the native relational database query, a native relational database query result; and

combining the constructed relational database query result with the received native relational database query result in accordance with the received relational database query.

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17. (Original) The method of claim 3, further comprising making information about the model available for use in building the received relational database query.

18. (Original) The method of claim 3, further comprising:

determining that the received relational database query is drawn against both the relational model of the multidimensional data source and one or more native relational tables; and

constructing a native relational database query based on aspects of the received relational database query drawn against conventional relational tables; and

submitting the native relational database query for execution against the conventional relational tables,

and wherein the constructed multidimensional database query is based on aspects of the received relational database query drawn against the relational model of the multidimensional data source.

19. (Currently Amended) A computer-readable [[storage]] medium comprising instructions to cause a computing system to process a relational database query, said instructions comprising:

a first set of instructions, executable on a processor, configured to generate a relational model of a multidimensional data source using one or more of a schema for the multidimensional data source and metadata for the multidimensional data source,

the relational model comprises;

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a relational-to-multidimensional mapping between a virtual relational table for a relational database application corresponding to the multidimensional data source and the multidimensional data source, and

the schema and metadata [[are]] accessed from the multidimensional data source for the virtual relational table;

a second set of instructions, executable on a processor, configured to form the relational database query from the relational database application against the relational model of the multidimensional data source using a graphical user interface, wherein the graphical user interface;

displays a presentation layer representation of the virtual relational table for the relational application corresponding to the multidimensional data source, [[and]]

enables pointer-driven selection for [[database]] query of one or more tables and columns of data stored in the multidimensional data source and represented by the displayed presentation layer representation, and

enables selection of a detail filter to apply against the relational model;

a third set of instructions, executable on a processor, configured to receive the relational database query, the received relational database query being drawn against the relational model of the multidimensional data source, wherein

the relational database query specifies a detail filter against the relational model having selected predicates;

a fourth set of instructions, executable on the processor, configured to use the relational-to-multidimensional mapping to translate the received relational database query into a

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multidimensional database query, wherein the multidimensional query specifies, for each of the selected predicates that can be applied against the relational model of the multidimensional data source before a crossjoin operation is performed, applying the selected predicate against the relational model of the multidimensional data source before the cross join operation is performed;

a fifth set of instructions, executable on the processor, configured to submit the multidimensional database query for execution against the relational model of the[[modeled]] multidimensional data source, wherein the multidimensional data source comprises three or more dimensions; and

a sixth set of instructions, executable on the processor, configured to display a result of the multidimensional database query against the modeled multidimensional data source.

20. (currently amended) The computer-readable [[storage]] medium of claim 19 further comprising:

a seventh set of instructions, executable on the processor, configured to receive, in response to submitting the multidimensional database query, a multidimensional database query result; and

an eighth set of instructions, executable on the processor, configured to use a relational-to-multidimensional mapping to translate the received multidimensional database query result into a relational database query result.

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21. (Currently Amended) A computing system for processing a relational database query, comprising:

a processor;

a display coupled to the processor;

a modeling subsystem configured to execute on the processor and further configured to generate a relational model of a multidimensional data source using one or more of a schema for the multidimensional data source and metadata for the multidimensional data source, wherein the relational model comprises:

a relational-to-multidimensional mapping between the virtual relational table for a relational database application corresponding to the multidimensional data source and the multidimensional data source, and

the schema and metadata [[are]] accessed from the multidimensional data source for the virtual relational table;

a graphical user interface subsystem configured to execute on the processor and further configured to form the relational database query from the relational database application against the relational model of the multidimensional data source, wherein the graphical user interface subsystem further

displays a presentation layer representation of [[a]]the virtual relational table for a relational database application corresponding to the multidimensional data source on the display,

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enables pointer-driven selection for [[database]] query of one or more tables and columns of data stored in the multidimensional data source and represented by the displayed presentation layer representation, and

enables selection of a detail filter to apply against the relational model;

a query reception subsystem configured to execute on the processor and further configured to receive the relational database query, the received relational database query being drawn against the relational model of the multidimensional data source, wherein the relational database query specifies a detail filter against the relational model having selected predicates;

a multidimensional query construction subsystem configured to execute on the processor and further configured to use the relational-to-multidimensional mapping to construct a multidimensional database query based on the received relational database query, wherein the constructed multidimensional query specifies, for each of the selected predicates that can be applied against the relational model of the multidimensional data source before a crossjoin operation is performed, applying the selected predicate against the relational model of the multidimensional data source before the cross join operation is performed; and

a query submission subsystem configured to execute on the processor and further configured to submit the constructed multidimensional database query for execution against the modeled multidimensional data source, wherein the multidimensional data source comprises three or more dimensions.

22. (Previously Presented) The computing system of claim 21, further comprising:

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a query result reception subsystem that receives, in response to submitting the multidimensional database query, a multidimensional database query result; and

a relational query result construction subsystem that uses a relational-to-multidimensional mapping to construct a relational database query result based on the received multidimensional database query result.

23-30. (Canceled)

31. (Currently Amended) A method for processing a relational database query, comprising:

generating, using a processor coupled to a multidimensional data source, a relational model of the multidimensional data source using one or more of a schema for the multidimensional data source and metadata for the multidimensional data source,

wherein the relational model comprises:

a relational-to-multidimensional mapping between a virtual relational table for a relational database application corresponding to the multidimensional data source and the multidimensional data source, and

the schema and metadata [[are]] accessed from the multidimensional data source for the virtual relational table;

forming the relational database query from the relational database application against a relational model of a multidimensional data source using a graphical user interface displayed on a display coupled to the processor, wherein the graphical user interface;

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displays a presentation layer representation of the virtual relational table for a relational database application corresponding to the multidimensional data source, [[and]] enables pointer-driven selection for database query of one or more tables and columns of data stored in the multidimensional data source and represented by the displayed presentation layer representation, and

enables selection of a detail filter to apply against the relational model;

receiving the relational database query, the received relational database query being drawn against both the relational model of a multidimensional data source and a native relational table, and wherein the relational database query specifies a detail filter against the relational model having selected predicates;

converting the received relational database query into (1) a native relational database query against only the native relational table, and (2) a multidimensional database query against the multidimensional data source, wherein the multidimensional query specifies, for each of the selected predicates that can be applied against the relational model of the multidimensional data source before a crossjoin operation is performed, applying the selected predicate against the relational model of the multidimensional data source before the crossjoin operation is performed;

submitting the native relational database query against the native relational table;

submitting the multidimensional database query against the multidimensional data source, wherein the multidimensional data source comprises three or more dimensions:

combining contents of a first search result produced in response to the native relational database query and a second search result produced in response to the multidimensional database query into a third search result responsive to the received relational database query; and

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displaying, on the display, the third search result.

32-34. (Canceled)

Allowable Subject Matter

8. Claims 3-5, 7-12, 14-22, and 31 are allowed.
9. The following is a statement of reasons for the indication of allowable subject matter.

With respect to independent 1, the prior art of record, single or in combination, does not teach or fairly suggest the step of:

“wherein the relational model comprises: a relational-to-multidimensional mapping between a virtual relational table for a relational database application corresponding to the multidimensional data source and the multidimensional data source, and the schema and metadata accessed from the multidimensional data source for the virtual relational table; forming the relational database query from the relational database application against the relational model of the multidimensional data source using a graphical user interface displayed on a display coupled to the processor, wherein the graphical user interface: displays a presentation layer representation of the virtual relational table for the relational database application corresponding to the multidimensional data source, enables pointer-driven selection for query of one or more

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tables and columns of data stored in the multidimensional data source and represented by the displayed presentation layer representation, and enables selection of a detail filter to apply against the relational model; receiving the relational database query, the received relational database query being drawn against the relational model of the multidimensional data source, wherein the relational database query specifies a detail filter against the relational model having selected predicates; using the relational-to-multidimensional mapping together with relational/multidimensional equivalency logic to construct a multidimensional database query based on the received relational database query, wherein the relational/multidimensional equivalency logic comprises a general mapping between relational queries and structures and multidimensional queries and structures, wherein the constructed multidimensional query specifies, for each of the selected predicates that can be applied against the relational model of the multidimensional data source before a crossjoin operation is performed, applying the selected predicate against the relational model of the multidimensional data source before the crossjoin operation is performed;”, in combination with the other claimed limitations.

With respect to independent 19, the prior art of record, single or in combination, does not teach or fairly suggest the step of:

“the relational model comprises: a relational-to-multidimensional mapping between a virtual relational table for a relational database application corresponding to the multidimensional data source and the multidimensional data source, and the schema and metadata accessed from the multidimensional data source for the virtual relational table; a second set of instructions, executable on a processor, configured to form the relational database

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query from the relational database application against the relational model of the multidimensional data source using a graphical user interface, wherein the graphical user interface: displays a presentation layer representation of the virtual relational table for the relational application corresponding to the multidimensional data source, enables pointer-driven selection for query of one or more tables and columns of data stored in the multidimensional data source and represented by the displayed presentation layer representation, and enables selection of a detail filter to apply against the relational model; a third set of instructions, executable on a processor, configured to receive the relational database query, the received relational database query being drawn against the relational model of the multidimensional data source, wherein the relational database query specifies a detail filter against the relational model having selected predicates; a fourth set of instructions, executable on the processor, configured to use the relational- to-multidimensional mapping to translate the received relational database query into a multidimensional database query, wherein the multidimensional query specifies, for each of the selected predicates that can be applied against the relational model of the multidimensional data source before a crossjoin operation is performed, applying the selected predicate against the relational model of the multidimensional data source before the cross join operation is performed;” , in combination with the other claimed limitations.

With respect to independent 21, the prior art of record, single or in combination, does not teach or fairly suggest the step of:

“wherein the relational model comprises: a relational-to-multidimensional mapping between the virtual relational table for a relational database application corresponding to the

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multidimensional data source and the multidimensional data source, and the schema and metadata accessed from the multidimensional data source for the virtual relational table; a graphical user interface subsystem configured to execute on the processor and further configured to form the relational database query from the relational database application against the relational model of the multidimensional data source, wherein the graphical user interface subsystem further displays a presentation layer representation of the virtual relational table for a relational database application corresponding to the multidimensional data source on the display, enables pointer-driven selection for query of one or more tables and columns of data stored in the multidimensional data source and represented by the displayed presentation layer representation, and enables selection of a detail filter to apply against the relational model; a query reception subsystem configured to execute on the processor and further configured to receive the relational database query, the received relational database query being drawn against the relational model of the multidimensional data source, wherein the relational database query specifies a detail filter against the relational model having selected predicates; a multidimensional query construction subsystem configured to execute on the processor and further configured to use the relational-to-multidimensional mapping to construct a multidimensional database query based on the received relational database query, wherein the constructed multidimensional query specifies, for each of the selected predicates that can be applied against the relational model of the multidimensional data source before a crossjoin operation is performed, applying the selected predicate against the relational model of the multidimensional data source before the cross join operation is performed”, in combination with the other claimed limitations.

With respect to independent 31, the prior art of record, single or in combination, does not teach or fairly suggest the step of:

“wherein the relational model comprises: a relational-to-multidimensional mapping between a virtual relational table for a relational database application corresponding to the multidimensional data source and the multidimensional data source, and the schema and metadata accessed from the multidimensional data source for the virtual relational table; forming the relational database query from the relational database application against a relational model of a multidimensional data source using a graphical user interface displayed on a display coupled to the processor, wherein the graphical user interface: displays a presentation layer representation of the virtual relational table for a relational database application corresponding to the multidimensional data source, enables pointer-driven selection for database query of one or more tables and columns of data stored in the multidimensional data source and represented by the displayed presentation layer representation, and enables selection of a detail filter to apply against the relational model; receiving the relational database query, the received relational database query being drawn against both the relational model of a multidimensional data source and a native relational table, and wherein the relational database query specifies a detail filter against the relational model having selected predicates; converting the received relational database query into (1) a native relational database query against only the native relational table, and (2) a multidimensional database query against the multidimensional data source, wherein the multidimensional query specifies, for each of the selected predicates that can be applied against the relational model of the multidimensional data source before a crossjoin operation is performed, applying the selected predicate against the relational model of the multidimensional

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data source before the crossjoin operation is performed” , in combination with the other claimed limitations.

Dependent claims are allowed for being dependent to an allowed claim.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee.

Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance".

Contact Information

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to MICHAEL PHAM whose telephone number is (571)272-3924. The examiner can normally be reached on 9am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Cottingham can be reached on 571-272-7079. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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